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NO DRAWINGS.

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COMPLETE SPECIFICATION.

Vehicle Brake.

We, ESCHER WYSS AKTIENGESELLSCHAFT, a Swiss Body Corporate, of Hardstrasse 319, Zurich (Switzerland), do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to vehicle brake parts, of the kind which are subjected to stress by sliding friction, such as brake shoes which act on the wheel rims of railway vehicles and brake discs.

One of our objects in the present invention is to provide a vehicle brake part of the above kind consisting of a material which, as compared with materials presently in use for such purposes generally, provides an improved braking efficiency with a longer operational life and which also is resistant to corrosion and reduces generation of wear dust and wear of the coacting surface.

In accordance with the present invention a vehicle brake part, of the kind which is subjected to stress by sliding friction, consists of a cast austenitic iron alloy composed by weight of 2.8% to 3.5% carbon, some of which is in the form of free carbon, 0.5% to 3% chromium, and 10% to 25% nickel or 0.5% to 7% manganese replacing a corresponding amount of said nickel, the balance being iron, the alloy being with or without one or more additional constituents, namely, by weight with respect to the alloy mass, 0.5% to 4% copper, 0.1% to 1% each of molybdenum, vanadium and/or titanium, and/or 0.6% to 1.5% phosphorus.

Although the cost of brake parts in accordance with the invention is relatively high as compared with materials at present in general use for the same purpose, nevertheless the resultant properties of low wear, efficient braking with reduced risk of damage to co-acting parts with reduction of wear dust and resistance to corrosion, increases the operational life of the parts to an extent which is most advantageous economically.

The ranges of 10% to 25% nickel, or the replacement by 0.5% to 7% manganese of a corresponding amount of nickel produces the austenitic structure of cast iron alloys of the invention.

In addition to the austenitic formers—nickel or nickel and manganese—it has been found advantageous, though not essential, to add a copper content of 0.5% to 4% which copper dissolves in the austenite.

It is furthermore advantageous to imbed in the groundmass, in addition to austenites, hard constituents such as carbides and/or

phosphides and to this end alloys of the invention include 0.5% to 3% chromium as an essential carbide-forming element. Optionally, the alloys of the invention can also include in this context, in addition to chromium, the following additional constituents or some of them either alternatively, or together, namely, 0.1% to 1% each of molybdenum, vanadium and/or titanium, and/or 0.6% to 1.5% phosphorus. In any event, the balance consists of iron.

Part of the carbon is present in alloys in accordance with the invention in free form, using silicon as additive to influence the formation thereof, as lamellae or spheroidal graphite. The latter form of graphite is obtained by treatment with the addition of magnesium, cerium, or both. A typical analysis of an austenitic cast iron alloy brake part in accordance with the invention is as follows, the sulfur content arising from impurities in the iron balance:

Carbon ...	2.8%	Nickel ...	19%
Silicon ...	2.3%	Manganese	1.5%
Phosphorus	0.6%	Copper ...	2%
Sulphur ...	0.06%	Chromium	0.5%

Balance — Iron

The material may also be subjected to heat treatment by annealing at temperatures from 800°C to 1000°C with accelerated or unaccelerated cooling.

The austenitic cast iron alloy brake parts in accordance with the invention, as compared with similar parts made of grey cast iron, have higher strength and deformation properties. These properties make it possible to dispense with a steel lining which is in general necessary in the case of grey cast iron brake shoes.

The following is a comparison between the properties of ordinary cast iron and austenitic cast iron alloys in accordance with this invention:—

	Ordinary Cast Iron	Austenitic cast iron alloy
Tensile Strength Kg/mm²	15—20	>35
Elongation %	<1	10— 40
Notch impact toughness Kgm/cm²	<0.3	>3
Brinell hardness Kg/mm²	180—250	170—260

WHAT WE CLAIM IS:—

1. A vehicle brake part, of the kind which is subjected to wear by sliding friction, consisting of a cast austenitic iron alloy composed by weight of 2.8% to 3.5% carbon, some of which is in the form of free carbon, 0.5% to 3% chromium, and 10% to 25% nickel or 0.5% to 7% manganese replacing a corresponding amount of said nickel, the balance being iron, the alloy being with or without one or more additional constituents, namely, by weight with respect to the alloy mass, 0.5% to 4% copper, 0.1% to 1% each of molybdenum, vanadium and/or titanium, and/or 0.6% to 1.5% phosphorus.

2. A brake part according to claim 1, in which the carbon is present partly in carbide form and partly as free carbon (lamellae graphite).

3. A brake part according to claim 1 or claim 2, in which the free carbon is present in spheroidal form.

4. A brake part according to claim 3, wherein the carbon of spheroidal form is obtained by treatment with magnesium or cerium or both.

5. A brake part according to any one of the preceding claims which is heat treated by annealing at temperatures from 800°C to 1,000°C.

6. A brake part according to any one of the preceding claims consisting of the cast austenitic iron alloy as described and exemplified herein.

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